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ABOUT COMPOSITION OF ESSENTIAL OIL FROM *Artemisia filatovae*

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The essential oil of an endemic (Kazakhstan) species of Artemisia filatovae, A. kurpijanov *sp. nov. (Filatov wormwood), is analyzed by gas chromatography on a capillary column with preliminary separation into fractions using adsorption chromatography on aluminum oxide. The components of* A. filatovae *essential oil differ from those of* A. glabella *Kar. et Kir. and* A. obtusiloba *Ldb.*

Artemisia filatovae A. Kuprijanov sp. nov. (Filatov wormwood) is a new endemic plant of the subspecies *Artemisia* L. growing in central Kazakhstan [1]. It is a shrub with woody stems and cracked gray bark. The lower leaves are gray with thick fuzz; the upper ones; feathery. It grows on the slopes of hills.

A. filatovae is botanically similar to *A. glabella* Kar. et Kir. (smooth wormwood) and *A. obtusiloba* Ldb. (blunt-lobed wormwood). It differs morphologically from the former in having sharply downturned leaves and pods; from the latter, woody stems and larger pods and leaves with wide lobes [1]. Thus it seemed interesting to study the chemical composition of the essential oil of *A. filatovae* and compare it with those of *A. glabella* [2] and *A. obtusiloba* [3].

The chemical composition of the essential oil of *A. filatovae* was determined using capillary GLC on a slightly polar phase with a flame-ionization detector. The oil consists of at least 116 compounds (Table 1). The component composition is complex and differs from those of closely related wormwood species.

According to the literature [2], the essential oil of *A. glabella* contains mostly 1,8-cineole (12%), linalool (8%), terpine-4-ol (6.5%), α-terpineol (5%), and sabinene derivatives (up to 5%). It should be noted that the essential oil of *A. glabella* contains azulene-like sesquiterpenes (up to 1%) that are absent in that of *A. obtusiloba*, which contains up to 50% linalool [3].

The quantity of components in essential oil of *A. filatovae* indicates that this species is differentiated from *A. glabella* [2] and *A. obtusiloba* [3] by the presence of a large amount of β-myrcene (18%), nerolidol (14%), β-elemene (11%), and pinan-2-ol (8%) in addition to achillene (5%), which is also characteristic of other Asteraceae species [4].

Thus, the study of the essential oil of *A. filatovae* confirms the previously demonstrated qualitative difference in the sesquiterpene lactone composition as a chemical signature of this plant compared with the closely related species *A. glabella* and *A. obtusiloba* [5, 6]. It also indicates that they belong to the single species *Obtusilobae* Poljak.

EXPERIMENTAL

The essential oil of *A. filatovae* was prepared by steam distillation of air-dried and ground above-ground parts of plants collected during flowering in the Ekibastuz district of Pavlodarsk region of the Republic of Kazakhstan. The oil is a dark blue liquid with a specific odor, $d_{20} = 0.944$, acid number 6.2, and ester number 9. The yield was 0.2-0.22% of air-dried starting material.

The component composition of the essential oil was determined by gas chromatography on a Khrom-5 instrument interfaced to a computer. A capillary column (50 m × 0.2 mm) with a methylsilicon phase was used. The temperature program was linear 80-250°C at 3°C/min. The injector temperature was 230°C; flame-ionization detector, 250°C; flow ratio, 1:80. The carrier gas was argon flowing at 0.8 ml/min.

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TABLE 1. Components of *A. filatovae* Essential Oil

Peak No.	Component	Content, wt. %	Peak No.	Component	Content, wt. %
1	Achillene	5.0	51	Cumic aldehyde	0.5
2	α-Touene	0.2	56	Thymol	0.2
3	Tricyclene	Tr.	57	Bornyl acetate	0.2
4	α-Pinene	0.9	59	Carvacrol	0.1
5	Camphene	0.3	66	γ-Elemene	0.1
6	α-Phenkhene	0.2	67	Cumic alcohol	0.3
7	Sabinene	3.0	71	β-Elemene	11.0
8	β-Pinene	2.5	72	Methyleugenol	0.2
9	Δ^3-Carene	0.4	74	β-Cariophyllene	0.7
10	α-Terpinene	0.3	75	β-Farnesene	1.3
11	β-Myrcene	18.0	80	Linalyl butyrate	0.2
13	α-Phellandrene	1.8	81	α-Celinene	0.6
15	*p*-Cymene	1.5	82	Longifolene	0.2
18	1,8-Cineol	4.3	83	γ-Celinene	2.4
19	*cis*-Ocimene	0.7	84	Valencene	1.42
21	γ-Terpinene	0.3	85	*cis*-Nerolidol	2.4
22	*trans*-Ocimene	0.5	86	α-Celinene[7-epi]	2.6
23	Terpinolene	0.6	88	γ-Cadinene	0.2
25	Linalool	0.3	91	*trans*-Nerolidol	11.8
26	Nonal	0.7	93	Spatulenol	2.0
28	*p*-Menth-3-enol	2.3	94	Cariophyllene oxide	0.5
32	Phenhone	1.5	95	Viridifluorenene	0.3
34	Dihydrocarveol	0.4	96	β-Bisabolene	0.3
35	Not identified	0.9	97	Farnesol[E,E]	0.4
36	*p*-Menth-3-en-9-ol	1.3	98	Δ-Cadinene	Tr.
37	Not identified	0.6	99	β-Santalol[E]	0.5
39	Pinan-2-ol	8.3	102	α-Bisabolol	0.3
40	Terpinen-4-ol	0.4	103	Farnesyl acetate [E,E]	0.4
42	*p*-Menth-8-enol	0.2	104	Hamazulene	0.4
43	α-Terpineol	0.6	109	6,10,14-Trimethylpentadecan-2-ol	0.3
44	*p*-Menth-3-en-7-ol	0.2	112	Not identified	2.5

The essential-oil components were identified by comparing their retention times in a mobile phase of C9-C22 normal hydrocarbons with those of known substances determined under the GLC conditions given above. The quantities of the compounds were determined by normalization with data processed by the computer.

The reliability of the identification was checked using a Hewlett—Packard chromato-mass spectrometer on a column (30 m × 0.25 mm) with a phenylsilicon liquid-phase coating and temperature program 50-270°C at 4°/min. The injector temperature was 250°C; flow ratio, 1:50. Mass spectra were obtained at 70 eV with scanning in the range from 10 to 450 *m/z*. The hydrocarbon and oxygen-containing portions of *A. filatovae* essential oil that were separated using adsorption chromatography on aluminum oxide (activated, III degree) were analyzed by chromato-mass spectroscopy. The results were compared with the literature [7].

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